ORDER NO. RQ7702-1400

Service Manual

Radio

RF-516

FM-AM PORTABLE RADIO

Original

SPECIFICATIONS

Frequency Range:	FM 87.5~108 MHz AM 520~1610 kHz (577~186m)
Intermediate Frequency:	FM 10.7 MHz AM 455 kHz
Sensitivity:	FM 3μV for 50mW Output AM 100μV/m for 50mW Output
Batteries:	3V (Two "AA" Size Penlight Batteries) (National UM-3 or equivalent)
Speaker:	6.5 cm ($2\frac{1}{2}$") PM Dynamic Speaker
Dimensions:	158(Wide) × 99.5(High) × 42(Deep)mm ($6\frac{7}{32}$" × $3\frac{29}{32}$" × $1\frac{5}{8}$")
Weight:	420g (15 oz) with batteries
Impedance:	Speaker .....8Ω Earphone Jack 8Ω

Specifications are subject to change without notice for further improvement.

National Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka, Japan

■ TO REMOVE CHASSIS

1. Open the battery cover.
2. Remove two (2) cabinet cover screws, nos. 1 & 2, as illustrated in fig. 1.
3. Open the cabinet cover.
4. Pull out three (3) connecting sockets.
5. Remove two (2) chassis screws, nos. 1 & 2, as illustrated in fig. 2.
6. To remove chassis completely, unsolder lead wire to speaker terminals.
7. To reassemble, reverse the above procedure and read the following notes.

Notes:

1. Set arrow mark of dial drum to arrow mark of cabinet as illustrated in fig. 3.
2. Turn tuning capacitor to fully minimum.
3. Insert the shaft of tuning capacitor in the hole of dial drum.

■ DIAL CORD INSTALLATION GUIDE

1. Remove chassis from cabinet.
   (Refer to chassis removal instruction.)
2. Remove tuning knob as illustrated in fig. 5.
3. Dial cord length is 80 cm (31½").
4. Turn dial drum to fulley clockwise.
5. Arrows (1~8) indicate correct order and direction of dial cord installation as illustrated in fig. 4.
6. Cement dial cord ends.

■ TO REMOVE DIAL POINTER

1. Pull out the cover as illustrated in fig. 6.
2. Remove dial pointer.

■ TO MOUNT DIAL POINTER

1. Set arrow mark of dial drum to arrow mark of cabinet as illustrated in fig. 3.
2. Set dial pointer to start point (0) of dial scale.
3. Attach dial cord to dial pointer.

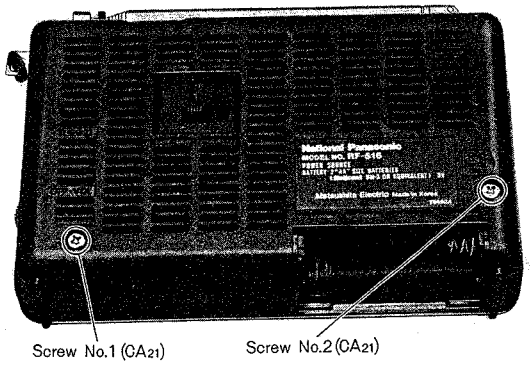


Fig. 1

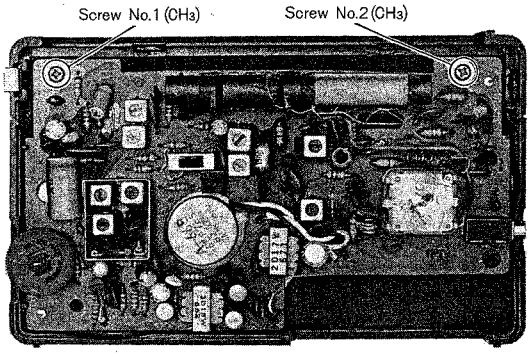


Fig. 2

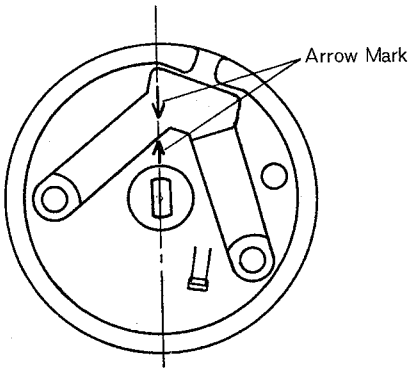


Fig. 3

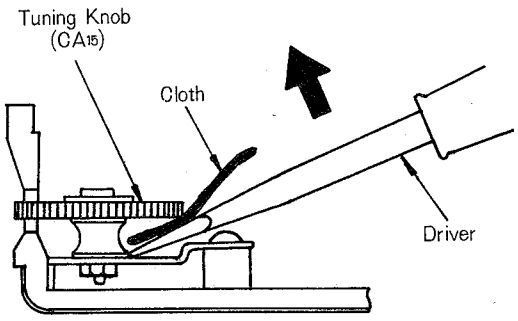


Fig. 5

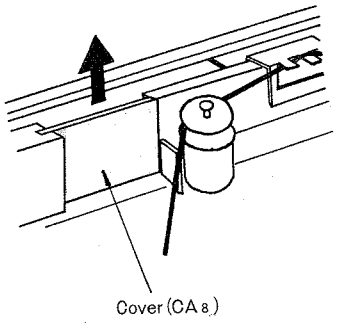


Fig. 6

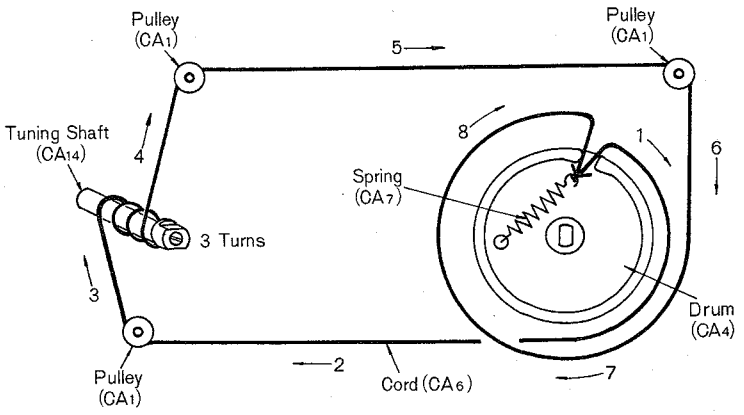
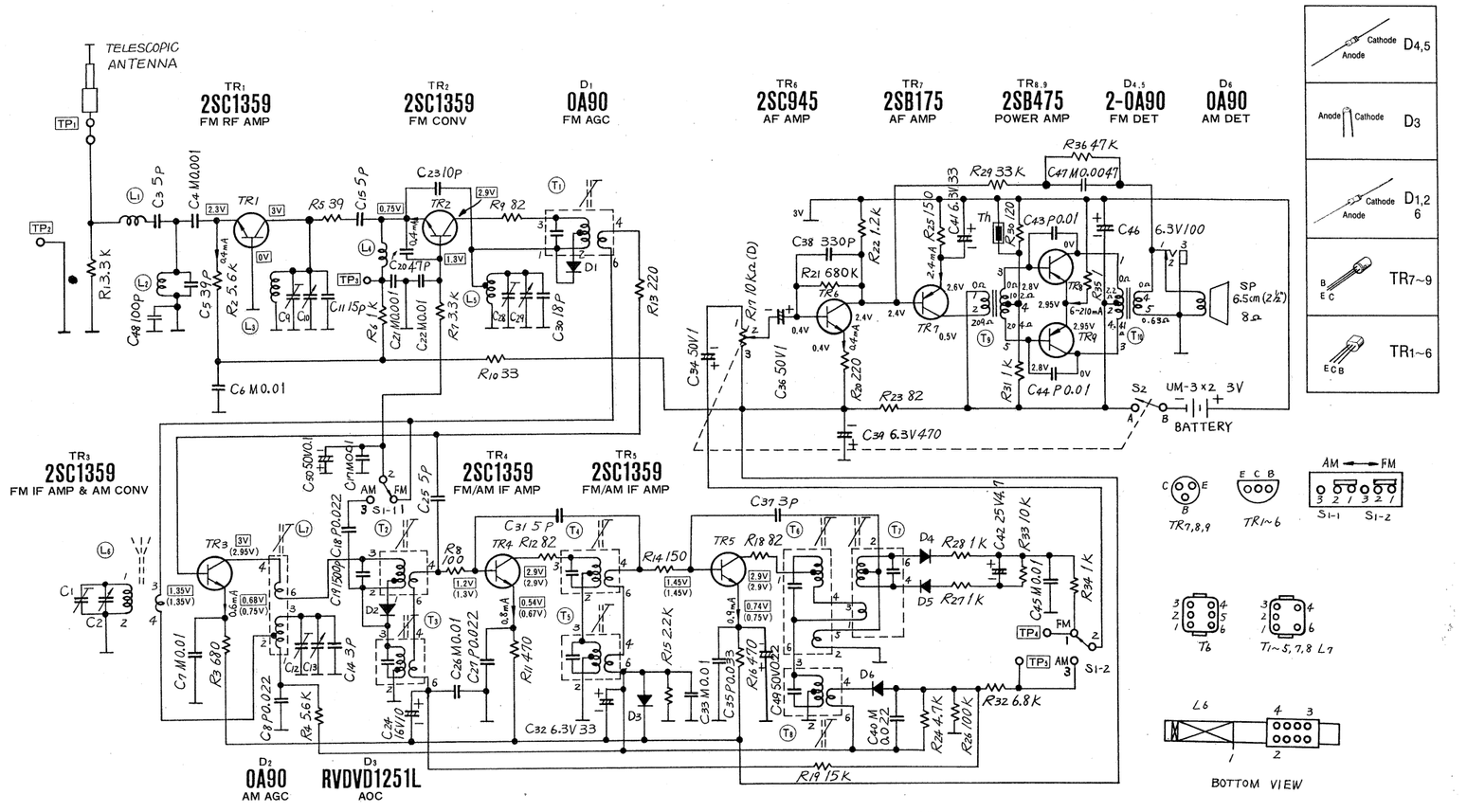


Fig. 4

Schematic Diagram – Model RF-516



Notes:

1. S1-1~S1-2: Band selector switch in "FM" position.
2. S2: Power source switch in "OFF" position.
3. DC voltage measurements are taken with circuit tester 10kΩ/V from negative terminal of battery.
   □ FM position ( ) AM position
4. Battery current: No signal 21mA
   Maximum 215mA

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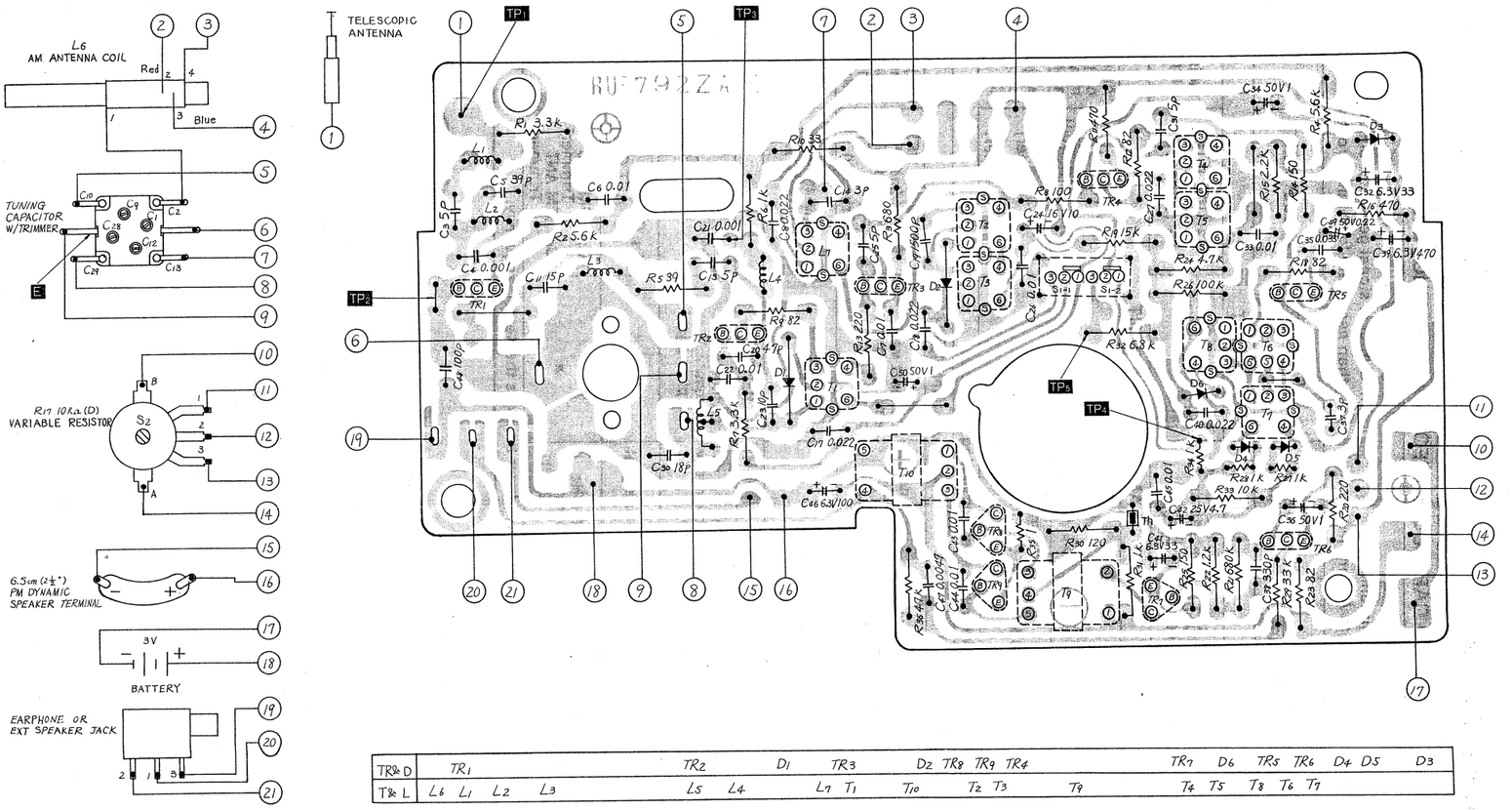
Circuit Board Wiring View – Model RF-516



TR & D	TR1	TR2	D1	TR3	D2	TR8	TR9	TR4	TR7	D6	TR5	TR6	D4	D5	D3
T & L	L6	L1	L2	L3	L5	L4	L7	T1	T10	T2	T3	T9	T4	T5	T8	T6	T7

TR1

	FM
C	3V
B	0V
E	2.3V
Ie	0.4mA

TR2

	FM
C	2.9V
B	1.3V
E	0.75V
Ie	0.4mA

TR3

	FM	AM
C	3V	2.95V
B	1.35V	1.35V
E	0.68V	0.75V
Ie	0.6mA	0.6mA

TR4

	FM	AM
C	2.9V	2.9V
B	1.2V	1.3V
E	0.54V	0.67V
Ie	0.8mA	0.8mA

TR5

	FM	AM
C	2.9V	2.9V
B	1.45V	1.45V
E	0.74V	0.75V
Ie	0.9mA	0.9mA

TR6

C	2.4V
B	0.4V
E	0.4V
Ie	0.4mA

TR7

C	0.5V
B	2.4V
E	2.6V
Ie	2.4mA

TR8 9

C	0V
B	2.8V
E	2.95V
Ie	6~210mA

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■ ALIGNMENT INSTRUCTIONS

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Notes:
1. Set volume control to minimum.
2. Set band selector switch to AM or FM.
3. Set power source voltage to 3 volts DC.
4. Output of signal generator should be no higher than necessary to obtain an output reading.

	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING [DISTANCE]	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
	CONNECTIONS	FREQUENCY				
	AM-IF ALIGNMENT					
(1)	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod. with 400 Hz.	Point of non-interference. (on/about 600 kHz).	Output meter across earphone jack.	T_2 (1st IFT) T_5 (2nd IFT) T_8 (3rd IFT)	Adjust for maximum output.
	AM-RF ALIGNMENT					
(2)	〃	550 kHz	550 kHz [6.91mm($\frac{8}{32}$'')]	〃	L_7 (OSC Coil) (＊1)L_6 (ANT Coil)	Adjust for maximum output. Adjust L_6 by moving coil bobbin along ferrite core.
(3)	〃	1500 kHz	1500 kHz [63.09mm ($2\frac{16}{32}$'')]	〃	C_{12} (OSC Trimmer) C_1 (ANT Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).
	(＊1) Cement antenna bobbin with wax after completing alignment.					
	FM-IF ALIGNMENT					
(4)	High side thru. 0.001μF to point TP3 Common to E.	10.7 MHz (400kHz SWP.)	Point of non-interference. (on/about 90 MHz).	Connect vert. amp. of scope to point TP4.	T_1 (FM 1st IFT) T_3 (FM 2nd IFT) T_4 (FM 3rd IFT) T_6 (FM 4th IFT) (Primary)	Adjust for maximum amplitude and proper linearity between ±100 kHz markers. (Refer to fig. 8).
(5)	〃	〃	〃	〃	T_7 (FM 4th IFT) (Secondary)	Adjust **T_7** so that 10.7 MHz marker appears at the center. (Refer to fig. 9).
	FM-RF ALIGNMENT					
(6)	Connect to point TP1 through FM Dummy antenna and E. (Refer to fig. 10).	87.5 MHz	Tuning capacitor fully closed.	Output meter across earphone jack.	L_5 (FM OSC Coil)	(＊2)Adjust for maximum output.
(7)	〃	90 MHz	Tune to signal	〃	L_3 (FM ANT Coil)	(＊2)Adjust for maximum output.
(8)	〃	106 MHz	106 MHz [58.44mm ($2\frac{8}{32}$'')]	〃	C_{28} (FM OSC Trimmer) C_9 (FM ANT Trimmer)	(＊2)Adjust for maximum output. Repeat steps (6)～(8).
	(＊2) Three output responses will be present; proper tuning is the center frequency.					

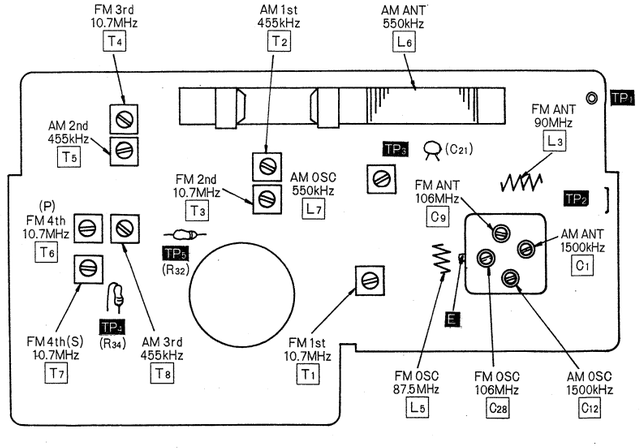

Fig. 7 Alignment points

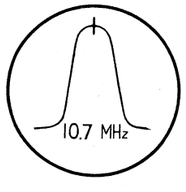

Fig. 8

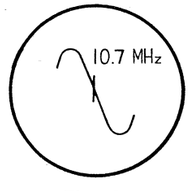

Fig. 9

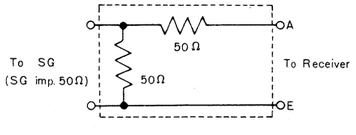

Fig. 10 FM Dummy Antenna

■ CABINET & CHASSIS PARTS LOCATIONS

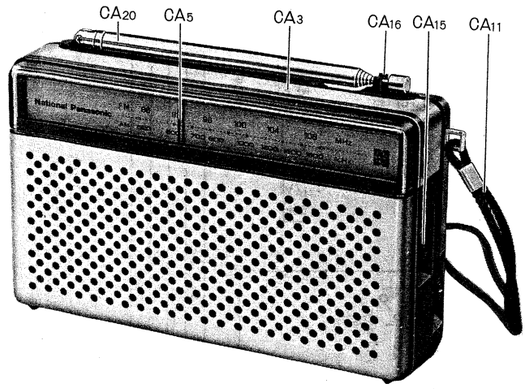

Fig. 11

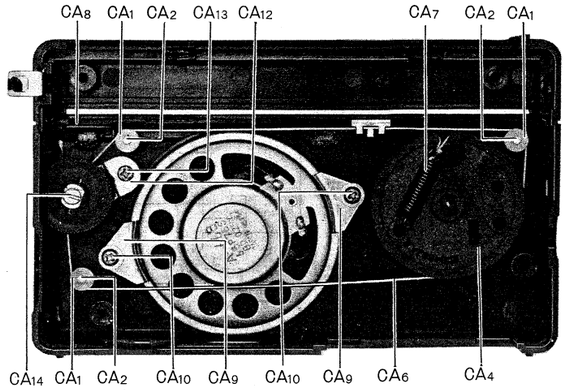

Fig. 12

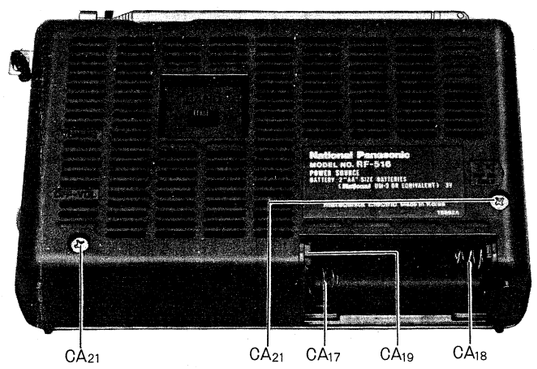

Fig. 13

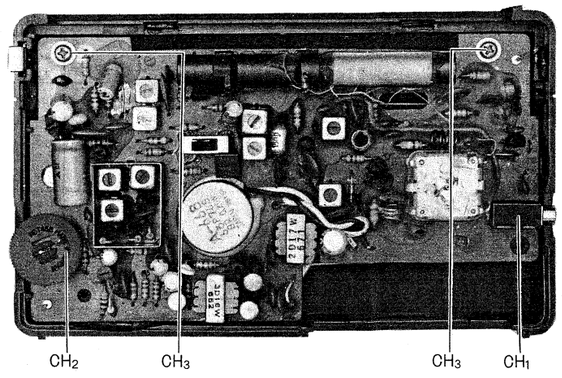

Fig. 14

■ ACCESSORIES & PACKING MATERIALS

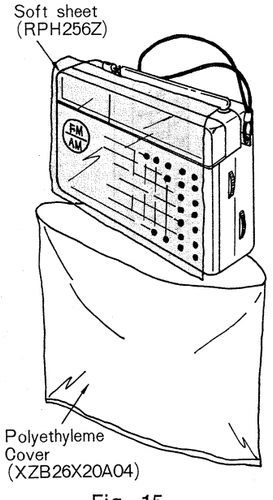

Fig. 15

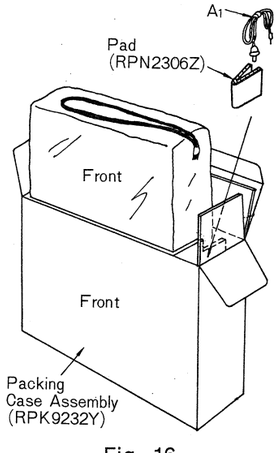

Fig. 16

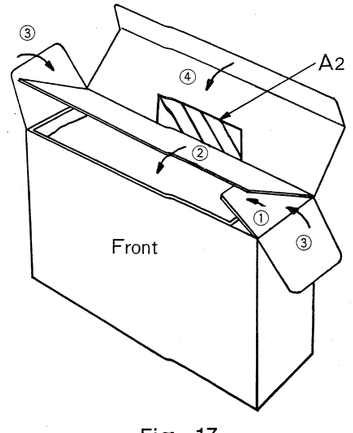

Fig. 17

■REPLACEMENT PARTS LIST·····Model RF-516

(RD7611-1400)

NOTES : 1.Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2.X−Z rank : X rank parts will cover 80% of repair needs.
X+Y rank parts will cover 95% of repair needs.
Z rank parts are less necessary.
3.Part numbers shown in bold letters are service standard parts and may differ from production parts.
5.The ○ mark is used by the manufacturing plant only.

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
TRANSISTORS AND DIODES					
TR1,2,3,4,5	2SC1359	Transistor(Si), FM RF Amp. FM Converter, FM IF Amp, & AM Converter, FM/AM IF Amp.	5		X
TR6	2SC945	Transistor(Si), AF Amp.	1		X
TR7	2SB175	Transistor(Ge), AF Amp.	1		X
TR8,9	2SB475	Transistor(Ge), Power Amp.	2		X
D1,2,6	OA90	Diode(Ge), FM AGC, AM AGC, AM Detector	3		X
D3	RVDVD1251L	Diode(Si), Operation Compensator	1		X
D4,5	2-OA90	Diode(Ge), FM Detector	1Pair		X
THERMISTOR					
Th	RRT171	Thermistor, Operation Compensator	1		X
COILS AND TRANSFORMERS					
L3	RLD4Y44	Antenna Coil, FM	1		X
L5	RLO4Y53	Oscillator Coil, FM	1		X
L6	RLF2Y43-O	Ferrite Antenna Coil, AM	1		X
L7	RLO2B77-M	Oscillator Coil, AM	1		X
T1	RLI4B153-M	IFT, FM 1st	1		X
T2	RLI2B124-M	IFT, AM 1st	1		X
T3,4	RLI4B351-M	IFT, FM 2nd & 3rd	2		X
T5	RLI2B257X-M	IFT, AM 2nd	1		X
T6	RLI4B510-M	IFT, FM 4th(Primary)	1		X
T7	RLI4B552-M	IFT, FM 4th(Secondary)	1		X
T8	RLI2B450X-M	IFT, AM 3rd	1		X
T9	RLT3D16-W	Input Transformer, P=2KΩ:S=3KΩ	1		X
T10	RLT2D17-W	Output Transformer, P=50Ω:S=8Ω	1		X
VARIABLE RESISTOR					
R17	EVLD8B851D14	Variable Resistor, 10KΩ(D), Volume Control, W/ON-OFF Switch (S2)	1		X

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
VARIABLE CAPACITORS					
C2,10,13,29	PVC2LX20T5L	Tuning Capacitor, W/Trimmer Capacitor(C1,9,12,28)	1		X
SPEAKER					
SP	RAS65P05	Speaker, Imp.8Ω, 6.5cm(2½"), PM Dynamic	1		○X
SWITCHES					
S1-1~S1-2	RSS139-F	Switch, Band Selector	1		X
RESISTORS					
R5	**ERD25TJ390**	39Ω, ⅖Watt, ±5%, Carbon	1		Z
R30	**ERD25TJ121**	120Ω, ⅖Watt, ±5%, Carbon	1		Z
R22	**ERD25TJ122**	1.2KΩ, ⅖Watt, ±5%, Carbon	1		Z
R2,4	**ERD25TJ562**	5.6KΩ, ⅖Watt, ±5%, Carbon	2		Z
R6,27,28,31, 34	**ERD25TJ102**	1KΩ, ⅖Watt, ±5%, Carbon	5		Z
R10	**ERD25TJ330**	33Ω, ⅖Watt, ±5%, Carbon	1		Z
R9,12,18,23	**ERD25TJ820**	82Ω, ⅖Watt, ±5%, Carbon	4		Z
R8	**ERD25TJ101**	100Ω, ⅖Watt, ±5%, Carbon	1		Z
R14,25	**ERD25TJ151**	150Ω, ⅖Watt, ±5%, Carbon	2		Z
R13,20	**ERD25TJ221**	220Ω, ⅖Watt, ±5%, Carbon	2		Z
R11,16	**ERD25TJ471**	470Ω, ⅖Watt, ±5%, Carbon	2		Z
R3	**ERD25TJ681**	680Ω, ⅖Watt, ±5%, Carbon	1		Z
R15	**ERD25TJ222**	2.2KΩ, ⅖Watt, ±5%, Carbon	1		Z
R1,7	**ERD25TJ332**	3.3KΩ, ⅖Watt, ±5%, Carbon	2		Z
R24	**ERD25TJ472**	4.7KΩ, ⅖Watt, ±5%, Carbon	1		Z
R32	**ERD25TJ682**	6.8KΩ, ⅖Watt, ±5%, Carbon	1		Z
R33	**ERD25TJ103**	10KΩ, ⅖Watt, ±5%, Carbon	1		Z
R19	**ERD25TJ153**	15KΩ, ⅖Watt, ±5%, Carbon	1		Z
R29	**ERD25TJ333**	33KΩ, ⅖Watt, ±5%, Carbon	1		Z
R36	**ERD25TJ473**	47KΩ, ⅖Watt, ±5%, Carbon	1		Z
R26	**ERD25TJ104**	100KΩ, ⅖Watt, ±5%, Carbon	1		Z
R21	**ERD25TJ684**	680KΩ, ⅖Watt, ±5%, Carbon	1		Z
R35	ERD14VJ1RO	1Ω, ¼Watt, ±5%, Carbon	1		Z
CAPACITORS					
C14,37	ECCD1H030C	3PF, 50WV,±0.25PF,Ceramic	2		Z
C15,25,31	ECCD1H050CC	5PF, 50WV,±0.25PF,Ceramic	3		Z
C23	ECCD1H100KC	10PF, 50WV,±10%, Ceramic	1		Z
C11	ECCD1H150K	15PF, 50WV,±10%, Ceramic	1		Z
C30	ECCD1H150KC	15PF, 50WV,±10%, Ceramic	1		Z
C20	ECCD1H470KC	47PF, 50WV,±10%, Ceramic	1		Z
C3	ECCD1H050C	5PF, 50WV,±0.25PF,Ceramic	1		Z
C5	ECCD1H390K	39PF, 50WV,±10%, Ceramic	1		Z

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
C48	ECCD1H101K	100PF, 50WV, ±10%, Ceramic	1		Z
C38	ECCD1H331K	330PF, 50WV, ±10%, Ceramic	1		Z
C4,21	ECKE1H102MD	0.001μF, 50WV, ±20%, Ceramic	2		Z
C47	ECKE1H472MD	0.0047μF, 50WV, ±20%, Ceramic	1		Z
C6,7,17,22,26 33,45	ECKE1H103MD	0.01μF, 50WV, ±20%, Ceramic	7		Z
C27	ECKE1H223MD	0.022μF, 50WV, ±20%, Ceramic	1		Z
C43,44	ECKE1H103ZF	0.01μF, 50WV, +80 −20 %, Ceramic	2		Z
C8,18	ECKE1H223ZF	0.022μF, 50WV, +80 −20 %, Ceramic	2		Z
C35	ECKE1H333ZF	0.033μF, 50WV, +80 −20 %, Ceramic	1		Z
C19	ECQS05152KZ	1500PF, 50WV, ±10%, Styrol	1		Z
C40	ECFDD223MD	0.022μF, 150WV, ±20%, Ceramic	1		Z
C32,41	**ECEA16V33**	33μF, 16WV, Electrolytic	2		Y
C46	**ECEA10V100**	100μF, 10WV, Electrolytic	1		Y
C39	**ECEA6V470**	470μF, 6.3WV, Electrolytic	1		Y
C24	**ECEA16V10**	10μF, 16WV, Electrolytic	1		Y
C42	**ECEA35V4R7**	4.7μF, 35WV, Electrolytic	1		Y
C34,36	**ECEA50V1**	1μF, 50WV, Electrolytic	2		Y
C49	**ECEA50ZR22**	0.22μF, 50WV, Electrolytic	1		Y
C50	**ECEA50ZR1**	0.1μF, 50WV, Electrolytic	1		Y
		CABINET			
	RYMF516XGKMK	Cabinet Body Assembly	1		○X
CA1	RDR21-1	Pulley, Dial	3		Z
CA2	RDY31A	Shaft, Pulley	3		Z
CA3	RGX804Z	Ornament	1		○Z
CA4	RDD456Z	Drum, Dial	1		○Y
CA5	RDP736Z	Pointer, Dial	1		○X
CA6	RDZ05A	Cord, Dial (500m)	1Roll		Y
CA7	RDS4090A	Spring, Dial	1		Y
CA8	RUV461Z	Cover	1		○Z
CA9	RMS30	Bracket, Speaker	2		Z
CA10	XTW3+8F	Screw, Speaker Bracket M'tg	2		Z
CA11	RKH84Z	Hand Strap	1		○Y
CA12	RUT25Z	Bracket, Tuning Shaft	1		○Z
CA13	XTN3+8C	Screw, Tuning Shaft Bracket M'tg	1		Z
	RDF224Z	Spacer, Tuning Shaft	1		○Z
CA14	RDF709Z	Tuning Shaft	1		○Z
	XWA3B	Washer, Tuning Shaft M'tg	1		Z
	XNG3CS	Nut, Tuning Shaft M'tg	1		Z
CA15	RBT96Z	Knob, Tuning	1		○X
	RYFF516XGKMK	Cabinet Cover Assembly	1		○X
CA16	RMA5034A	Bracket, Telescopic Antenna	1		Z
CA17	RJC710A	Battery Spring, ⊖ Side	1		Y
CA18	RJC702A	Battery Spring, ⊕,⊖ Side	1		Y
CA19	RJC728Z	Battery Terminal, ⊕ Side	1		Y
CA20	**XEARK102GDY**	Telescopic Antenna, 7 Steps, 600mm	1		○X
	XTN23+8C	Screw, Telescopic Antenna M'tg	1		Z
	RKK120Z	Battery Cover	1		○X
CA21	XTB3+30CFN	Screw, Cabinet Cover M'tg	2		Z

Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
		CHASSIS			
CH1	RJJ19Z-C	Jack, Earphone & EXT. Speaker	1		X
CH2	RBT45B	Knob, Volume	1		Y
	XYN26+C5	Screw, Tuning Capacitor M'tg	2		Z
CH3	XTW3+10F	Screw, Chassis M'tg	2		Z
		ACCESSORIES			
A1	**XEH1A1-P**	Magnetic Earphone	1		Y
A2	RQX6064Z	Instruction Book	1		○Y

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